IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

John CUTMORE et al

Serial No.: To be assigned
National Phase of PCT/AU00/00668

Filed: December 14, 2001

For: EDGE STRIP CAP

NOTICE OF CLAIM FOR PRIORITY

Honorable Commissioner of
Patents and Trademarks
Washington, D.C. 20231

Sir:

The benefit of the filing date of the following prior foreign application filed in the following foreign country is hereby requested for the above-identified application and the priority provided in 35 USC 119 is hereby claimed:

Australian Provisional Patent Application No. PQ 1068, Filed June 18, 1999

It is requested that the file of this application be marked to indicate that the requirements of 35 USC 119 have been fulfilled and that the Patent and Trademark Office kindly acknowledge receipt of this document.

Respectfully submitted,

Date: Dec. 14, 2001

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PCT/AU00/00668

Patent Office
Canberra

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I, ANNA MAIJA EVERETT, ACTING TEAM LEADER EXAMINATION SUPPORT & SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. PQ 1068 for a patent by COPPER REFINERIES PTY LTD filed on 18 June 1999.

WITNESS my hand this
Twenty-ninth day of June 2000

A. M. Everett.

ANNA MAIJA EVERETT
ACTING TEAM LEADER
EXAMINATION SUPPORT & SALES

PRIORITY DOCUMENT
SUBMITTED OR TRANSMITTED IN COMPLIANCE WITH RULE 17.1(a) OR (b)

AUSTRALIA

PATENTS ACT 1990

PROVISIONAL SPECIFICATION

FOR THE INVENTION ENTITLED:-

"EDGE STRIP CAP"

The invention is described in the following statement:-

TECHNICAL FIELD

The present invention relates to edge strips for cathodes as used in electro-refining metal.

BACKGROUND ART

The ISA process as developed by Mount Isa Mines and Copper Refineries Limited in Australia in which copper or other non-ferrous metals are deposited on stainless steel cathode plates is well-known. The electrolytically deposited metal is normally stripped from the cathode by first flexing the cathode to cause at least a part of the copper deposit to separate from the cathode and then mechanically stripping or gas blasting the remainder of the copper from the cathode.

Generally, deposition of metal on the edge portions of the plate is avoided since this renders the deposited metal more difficult to strip from the cathode plate. Edge strip protectors such as plastic strip mouldings, wax coating or a combination of both may be used to avoid deposition of metal on the edge portions of the cathode plate. Generally, the longitudinal edges of the cathode plate are protected. Depending upon process requirements, the bottom end edge may be covered or left exposed. A typical example is shown in Figure 1. The cathode plate comprises stainless steel sheet 14 welded along it upper surface to hanger bar 11. On either longitudinal edge portion an edge strip 18 is provided to prevent metal deposition along the longitudinal edges of the cathode.

There have been many previously proposed edge strip configurations and methods of connecting those edge strips to the cathode plates. Some edge strips are chemically bonded to the plate, others are mechanically attached eg by a series of pins running laterally through the edge strip and cathode plates.

Chemical bonding is not always reliable and can tend to breakdown on exposure to the electrolyte solution and heat. Mechanical bonding is both expensive and time consuming to install. Regular maintenance and reinstallation is required after several cycles of deposit/flex/strip of the plates.

Australian patent application no. 15464/99 discloses a two-piece edge protector strip for a cathode plate. This protector strip has a first channel member of relatively resilient material eg rubber. This channel member is wrapped around the edge portions of the cathode plate and then forced into a second channel member which in turn grips and holds both the first channel member and the edge portions of the cathode plate. While this arrangement is useful in that it does not require additional chemical or mechanical bonding, certain difficulties have still arisen with this technology.

Generally, edge strips extend to or below the bottom end edge of the respective cathode plate. Accordingly, in use, any force applied to the bottom of the cathode plate/edge strip arrangement is transmitted to the edge strips and tends to shear or at least move the edge strips relative to the cathode plate. Any such movement or damage of the edge strip can be extremely detrimental to the process. It is both costly and time consuming to replace or reposition such edge strip protectors.

Another disadvantage of the prior art arises from the deposition of metal on that portion of the cathode plate held in the edge plate strip. It is intended to provide a close fit in the edge strip to prevent substantial ingress of electrolyte but more particularly to prevent deposition of metal in this region. Obviously if metal is deposited on that portion of the cathode plate held by the edge strip, such deposition of metal may force open and detach the edge strip from the cathode plate.

Various mechanisms have been proposed to prevent such deposition of metal on the edge portions of the cathode plate. These include resilient collars on the edge strips or filling the edge strips with suitable sealant such as silicone.

Most of these techniques have now become obsolete by providing closer tolerance of the edge strip to the cathode plate. However, a perennial problem remains, namely growth of the deposited metal on the end edge of that portion of the cathode plate received in the edge strip.

As mentioned above, the edge strips terminate at or slightly above the bottom end edge of the cathode plate. The bottom end edge of the cathode plate held in the edge strip, however, is exposed to electrolyte and metal may freely deposit along this bottom end edge. Generally this does not cause structural failure of the edge strip, however, once the metal is stripped from the cathode these additional deposits or "dags" remain on the stripped metal providing an unattractive product. In severe causes these deposits act to bridge the metal sheets stripped from either side of the cathode plate making their separation quite difficult.

Various mechanisms have been proposed in sealing of this end edge of the cathode plate including end caps, filling the end portion with silicone sealant or indeed covering the entire bottom end edge with an edge strip protector. Each of these methods, however, have only proved partially successful.

It is an object of the present invention to overcome or ameliorate at least one of the disadvantages of the prior art, or to provide a useful alternative.

DISCLOSURE OF THE INVENTION

In a first aspect, the present invention provides an edge strip for a cathode plate, said strip having a longitudinally extending channel for receiving an edge portion of the cathode plate and at least one support member in said channel, said support member providing a shoulder portion adapted to abut a complimentary surface of a cathode plate and thereby support the cathode plate in the edge strip.

The cathode plate may include a series of support members along its length. In one particularly preferred embodiment, the edge strip is provided at its lower end with an end cap, the support member extending longitudinally in the channel from the end cap to support a lower end edge of the cathode plate.

In a second aspect, the present invention provides a cathode plate comprising a metal plate portion for deposition of metal and two edge strips extending along longitudinal edge portions of the metal plate, each strip having a longitudinally extending channel receiving an edge portion of the cathode plate and a tab extending longitudinally in said groove from said lower end and adapted to mate with a complimentary recess formed in a respective end corner of the cathode plate, the bottom end edge of the edge portion being spaced from the exposed bottom edge of the cathode to thereby reduce metal deposition on said bottom end edge within said edge strip.

Preferably, the support member/tab and the end cap are of unitary construction or the tab/support member may also be provided integrally with the edge strip itself. Alternatively, the tab/support member may be provided as a separate piece. Apart from the aforementioned tab/support member arrangement, the remainder of the edge strip can be of any conventional construction. It is suitable for use with single piece edge strips

which may include additional chemical or mechanical fastening or two piece type edge strips as disclosed in Australian patent application no. 15464/99.

Unless the context clearly requires otherwise, throughout the description and the claims, the words 'comprise', 'comprising', and the like are to be construed in an inclusive sense as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including, but not limited to".

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 is a front elevational view of a conventional cathode plate with edge strip(s).

Figure 2 is a perspective view of the separate components of the first embodiment of the present invention, and

Figure 3 is a side elevational view of the components of Figure 1 in situ.

MODE FOR CARRYING OUT THE INVENTION

The present invention comprises edge strip 10 and tab or support member 50. The edge strip shown in Figure 2 is similar to that disclosed in Australian patent application no. 15464/99. It comprises a first resilient channel member 15 adapted to be held within a channel 20 formed by second relatively rigid channel member 25. An end cap 30 closes the end of channel 20 at the lower end of the edge strip.

The edge strip is adapted to receive edge portion 110 of cathode plate 100. Tab member 50 is also adapted to be received in longitudinally extending channel 20. In the

examples shown, tab member 50 is provided as a separate piece, however, it may be integrally formed with edge strip 10, end cap 30 or rigid channel member 25.

Tab member 50 provides a shoulder portion 55 adapted to support the cathode plate. As shown more clearly in Figure 3, in use the shoulder portion 55 abuts support surface 120 of the cathode plate 100 and thereby supports the cathode plate in the edge strip. Of course as will be apparent, a person skilled in the art, an identical edge strip may be provided on the opposite edge portion of the cathode plate such that it is supported on both sides.

Unlike previously proposed chemical or mechanical bonded edge strips, any force applied to the edge strip eg by dropping the cathode plate/edge strip arrangement, is transmitted from the edge strip via tab 50 to the cathode plate 100. All force is directed through tab 50 to the mother plate and accordingly relative movement in the longitudinal direction between edge strip 10 and cathode plate 100 is eliminated or at least reduced. This is a significant advantage over and above the prior art systems which required chemical bonding or mechanical bonding by pins etc which could shear if a severe force was applied.

In this embodiment, only one tab/support member 50 is shown. It would be appreciated by persons skilled in the art, however, that it may be desirable to have several tab/support members 50 to support the cathode plate 100 along the length of the edge strip.

Another advantage which arises from the embodiment shown in Figures 2 and 3 is the way metal is deposited in the lower region of the cathode plate. As discussed above, generally the bottom end edge of the cathode plate 100 extends along the entire width of

the plate. In this instance, however, a recess is formed at the bottom end edges such that the bottom edge 120 of the edge portion 110 of the cathode plate is spaced from the exposed bottom edge 140 of the cathode plate. This spacing of edge 120 from edge 140 is significant in that it increases the resistance to deposition of metal such that metal will generally preferentially deposit on the exposed portions of the cathode plate including vertical edge 130 rather than deposit on edge 120. Since edge 130 is in the longitudinal direction it does not create as great a problem as growth in the lateral direction. Further, any metal deposited along edge 130 is in the direction of stripping ie the longitudinal direction of the plate. Accordingly, it does not interfere with stripping of the metal sheets on either side of the cathode plate. As known to persons skilled in the art, the dags or additional growth along the bottom end edge of the plate can make separation of the sheets from either side of the cathode plate and from each other more difficult. It will be appreciated that variations can be made to the method and apparatus described without departing from the spirit or scope of the present invention.

DATED this 18th Day of June 1999

COPPER REFINERIES PTY LIMITED

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Fellow Institute of Patent Attorneys of Australia
of BALDWIN SHELSTON WATERS

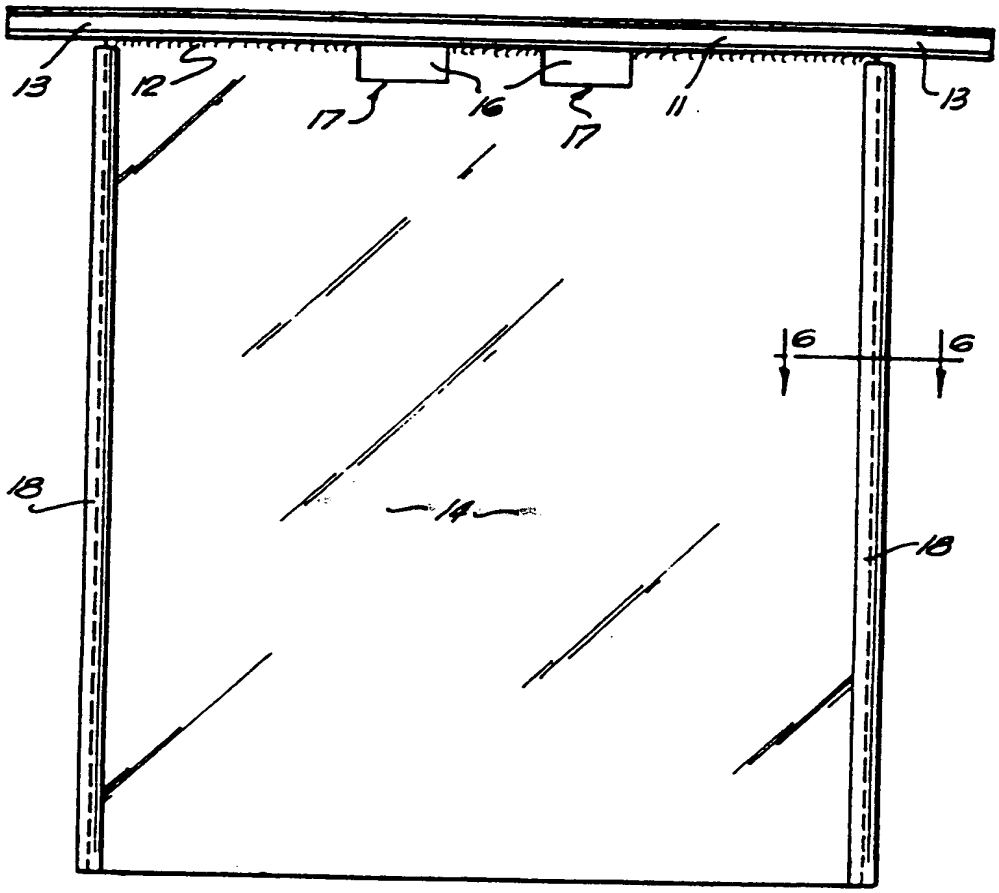

Fig 1

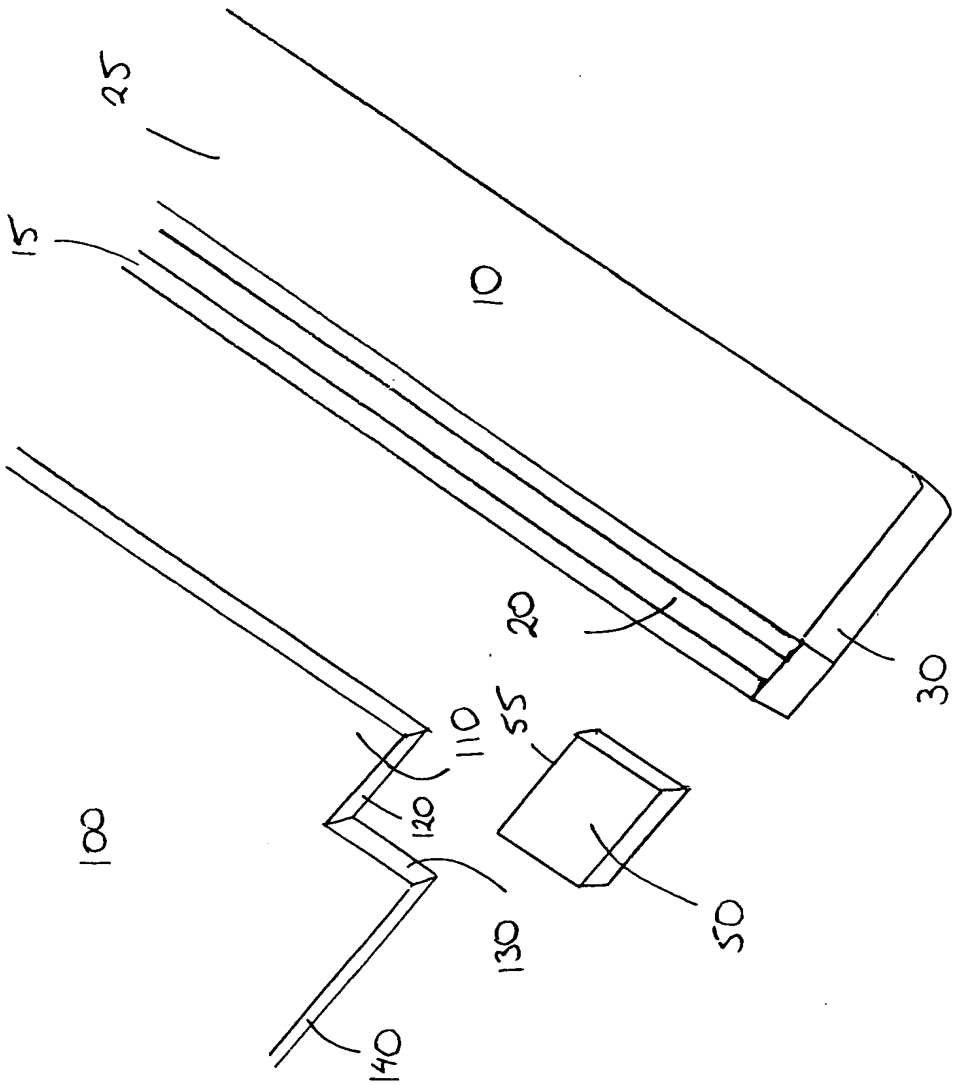

Fig 2

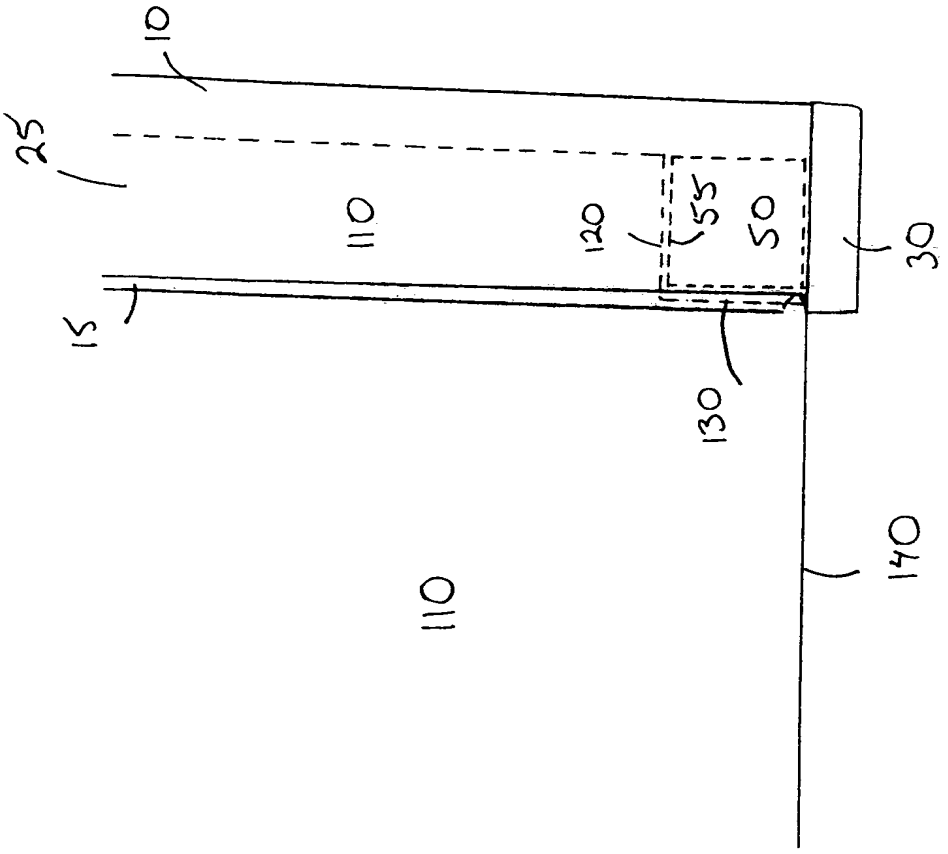

Fig 3